

FIG. 1

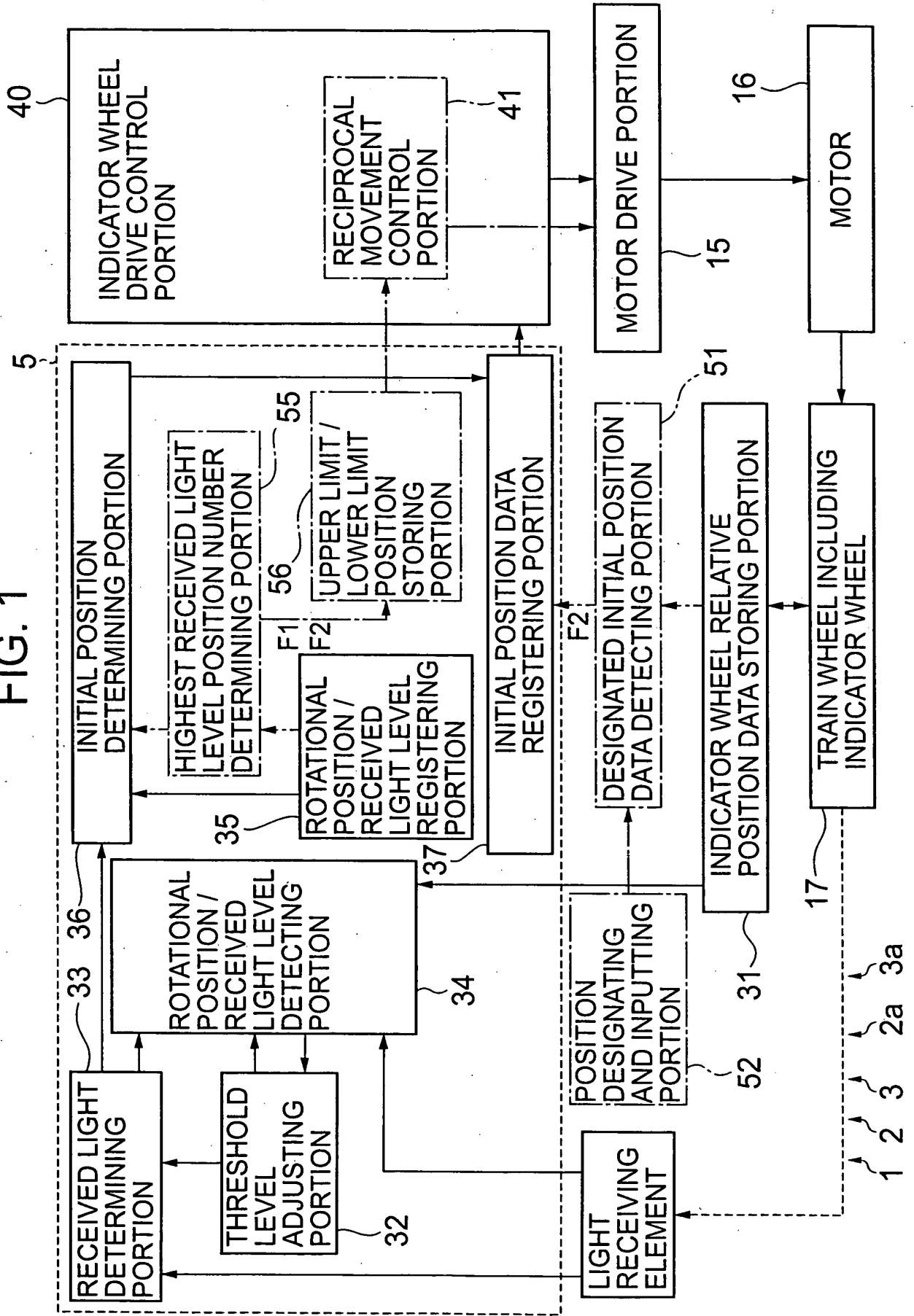
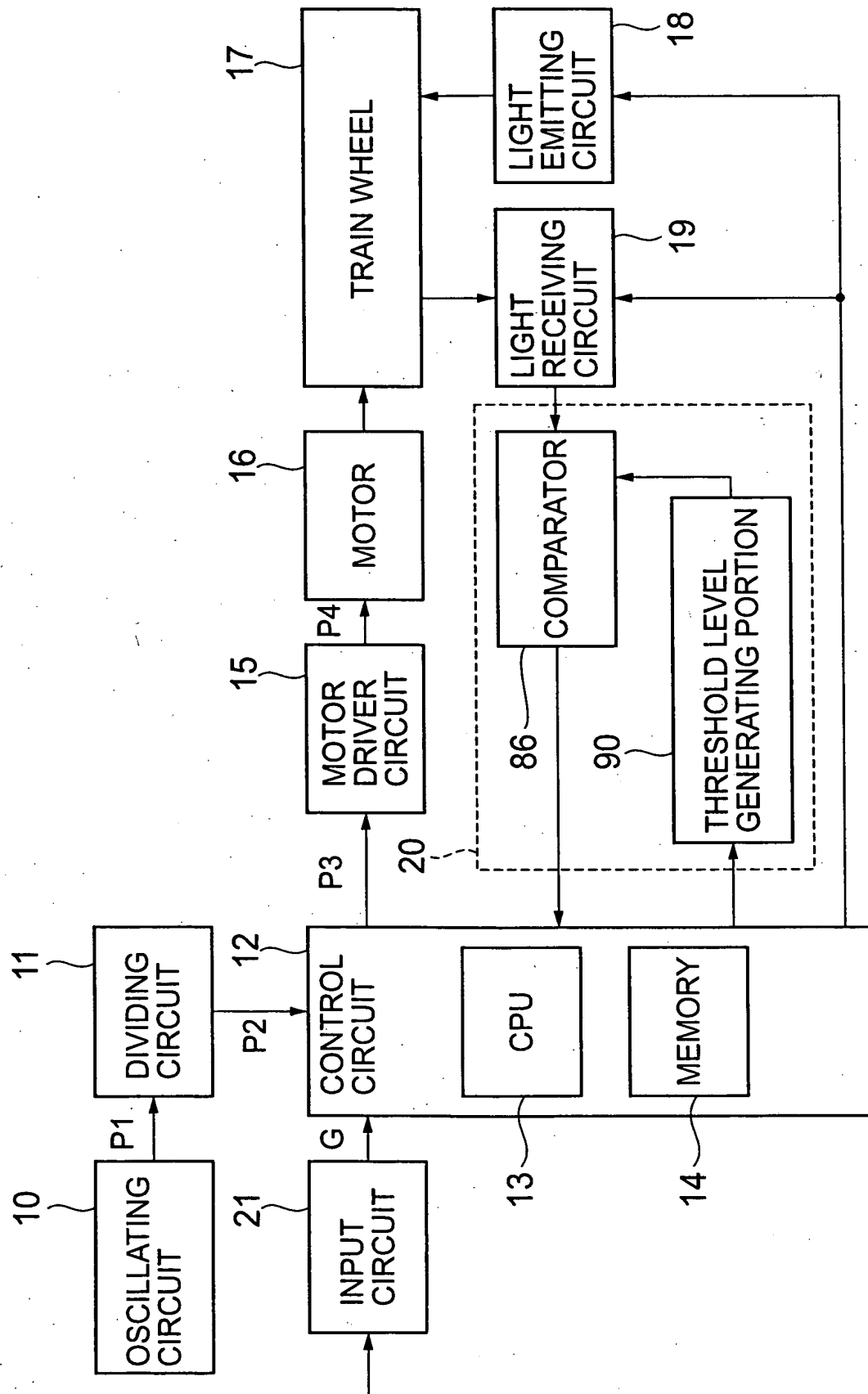


FIG. 2



[illegible]

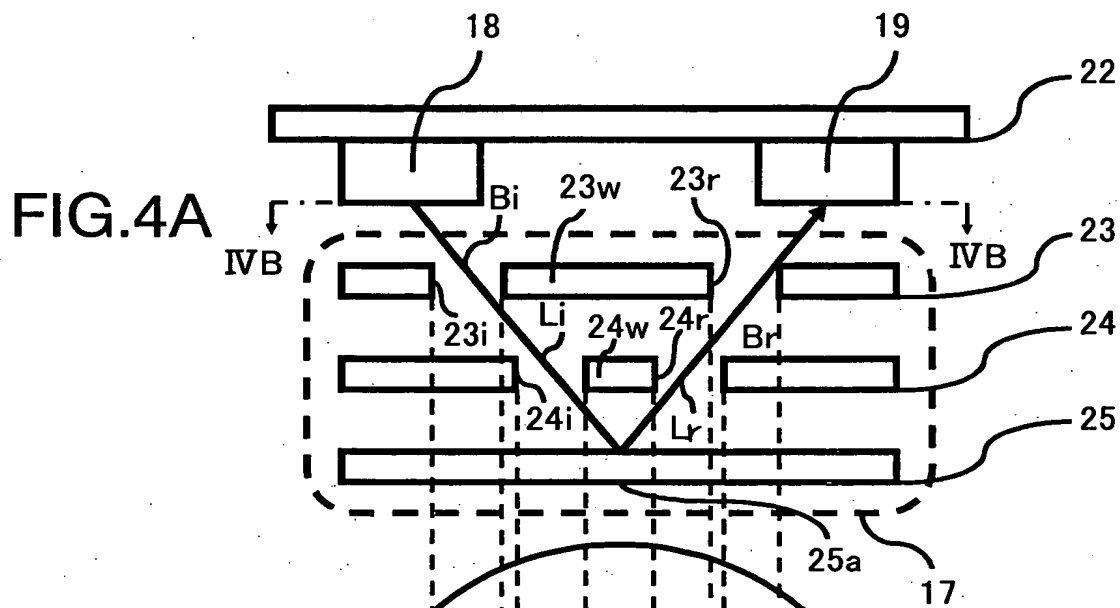


FIG.4B

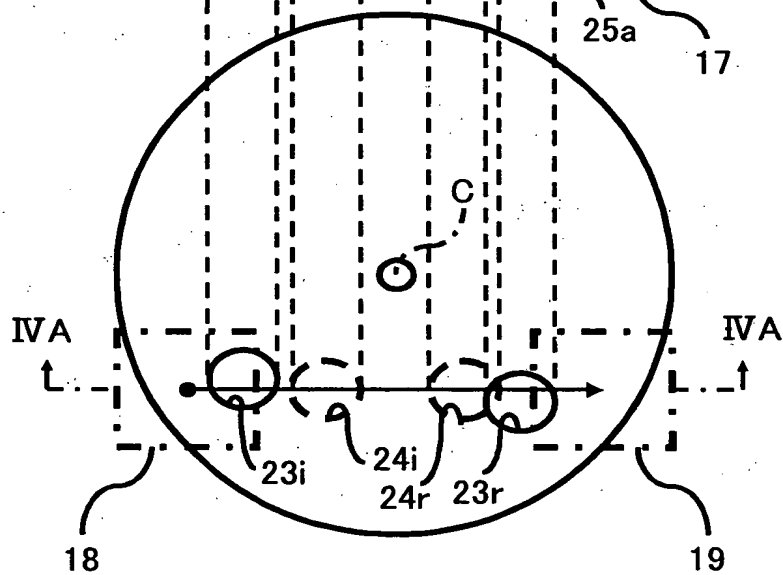


FIG. 5

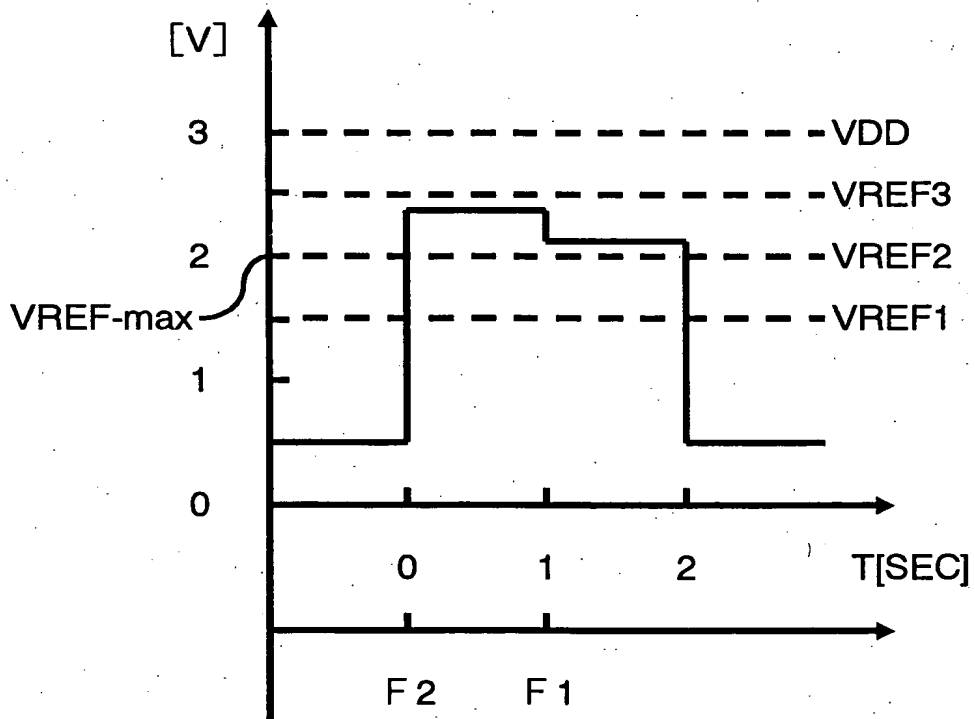
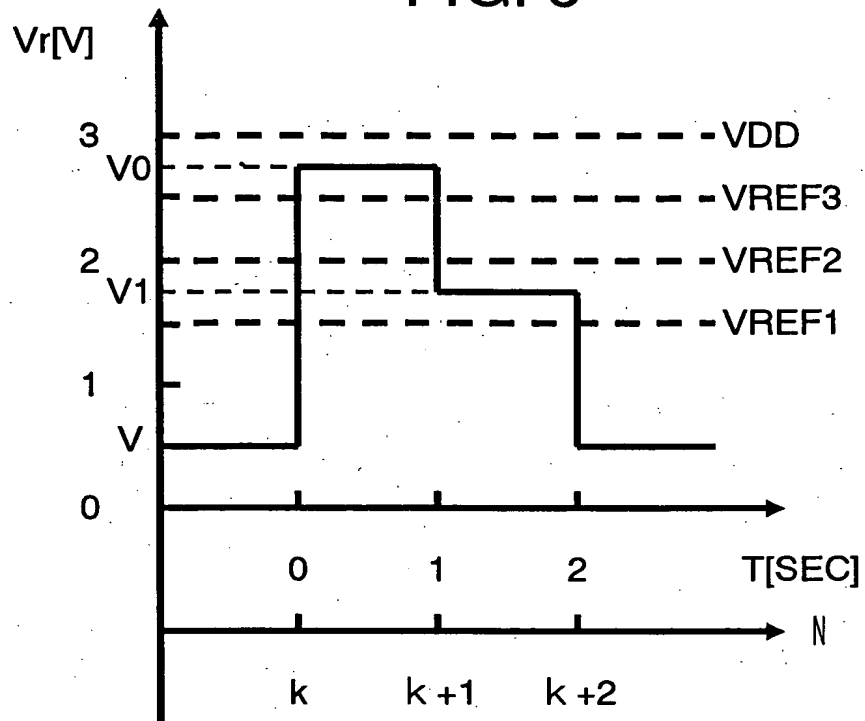


FIG. 6

FIG. 7

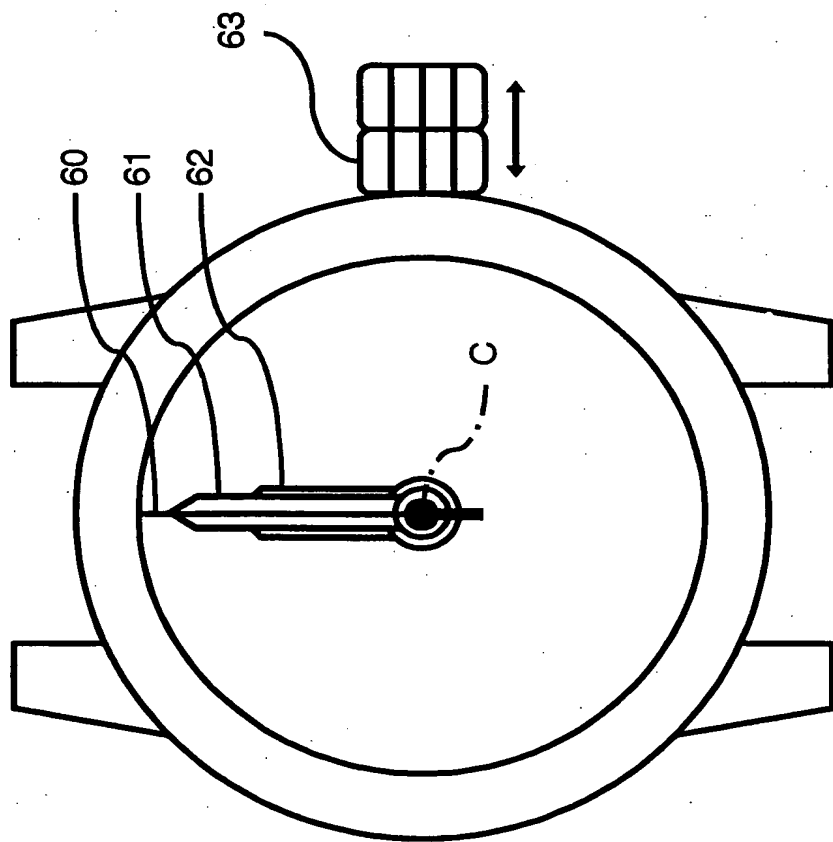


FIG. 8

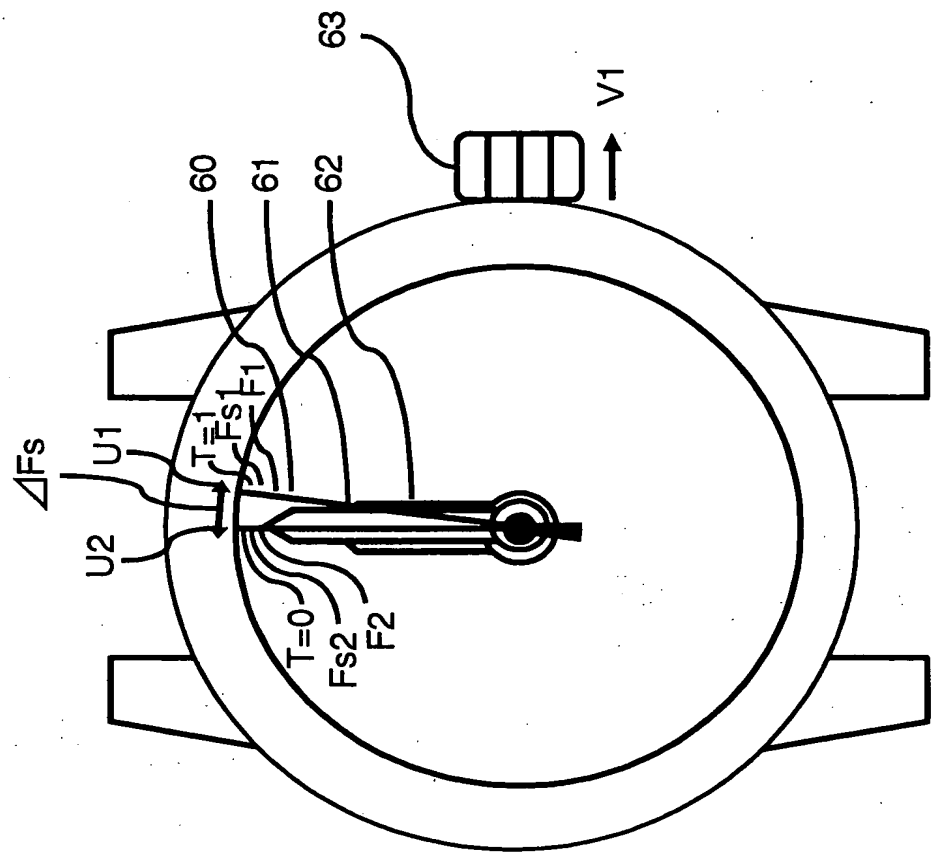


FIG. 9

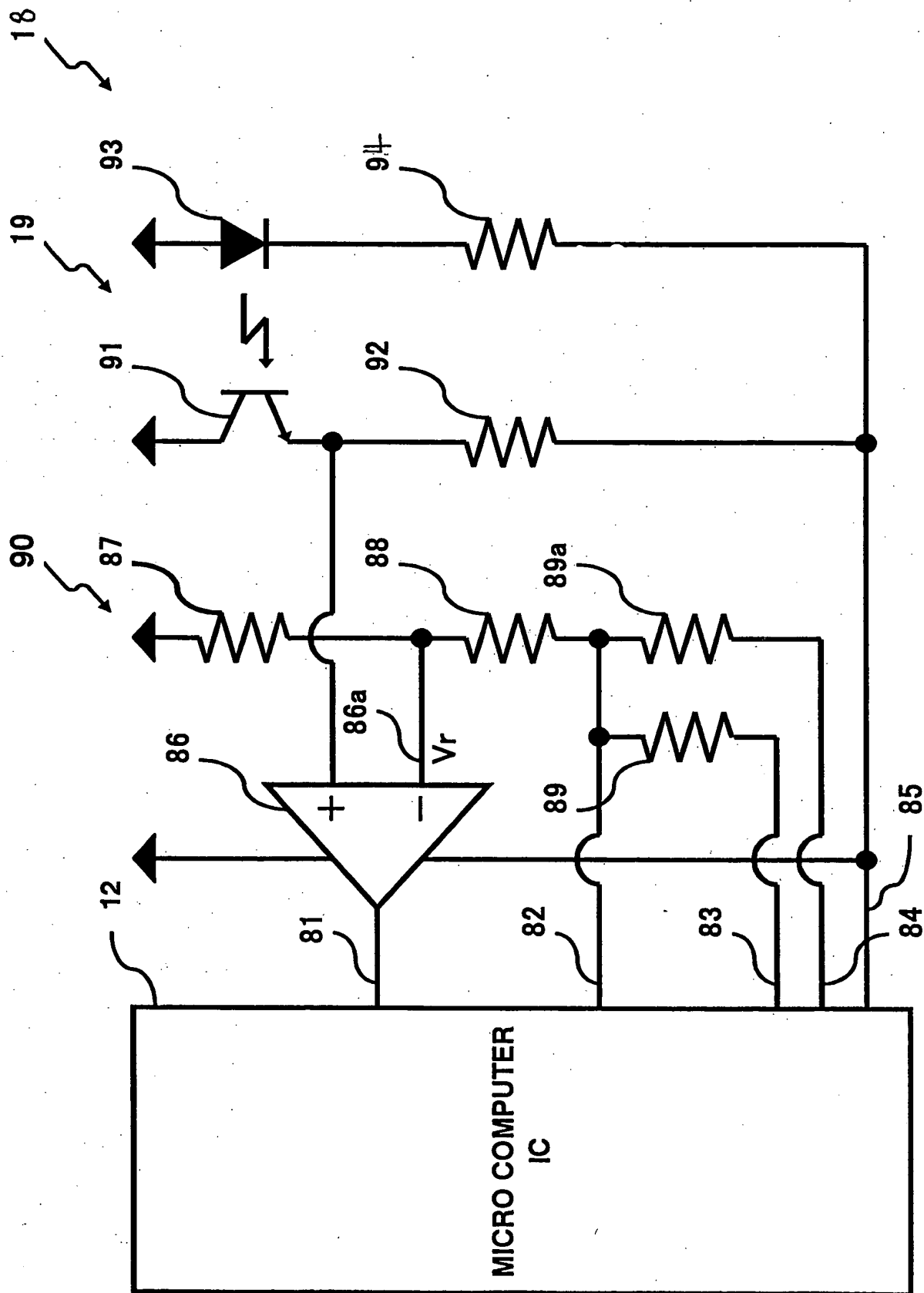


FIG. 10

REFERENCE VOLTAGE		PORT 82	PORT 83	PORT 84
VREF1	1.5V	VSS	Hi-Z	Hi-Z
VREF2	2.0V	Hi-Z	VSS	Hi-Z
VREF3	2.5V	Hi-Z	Hi-Z	VSS

FIG. 11

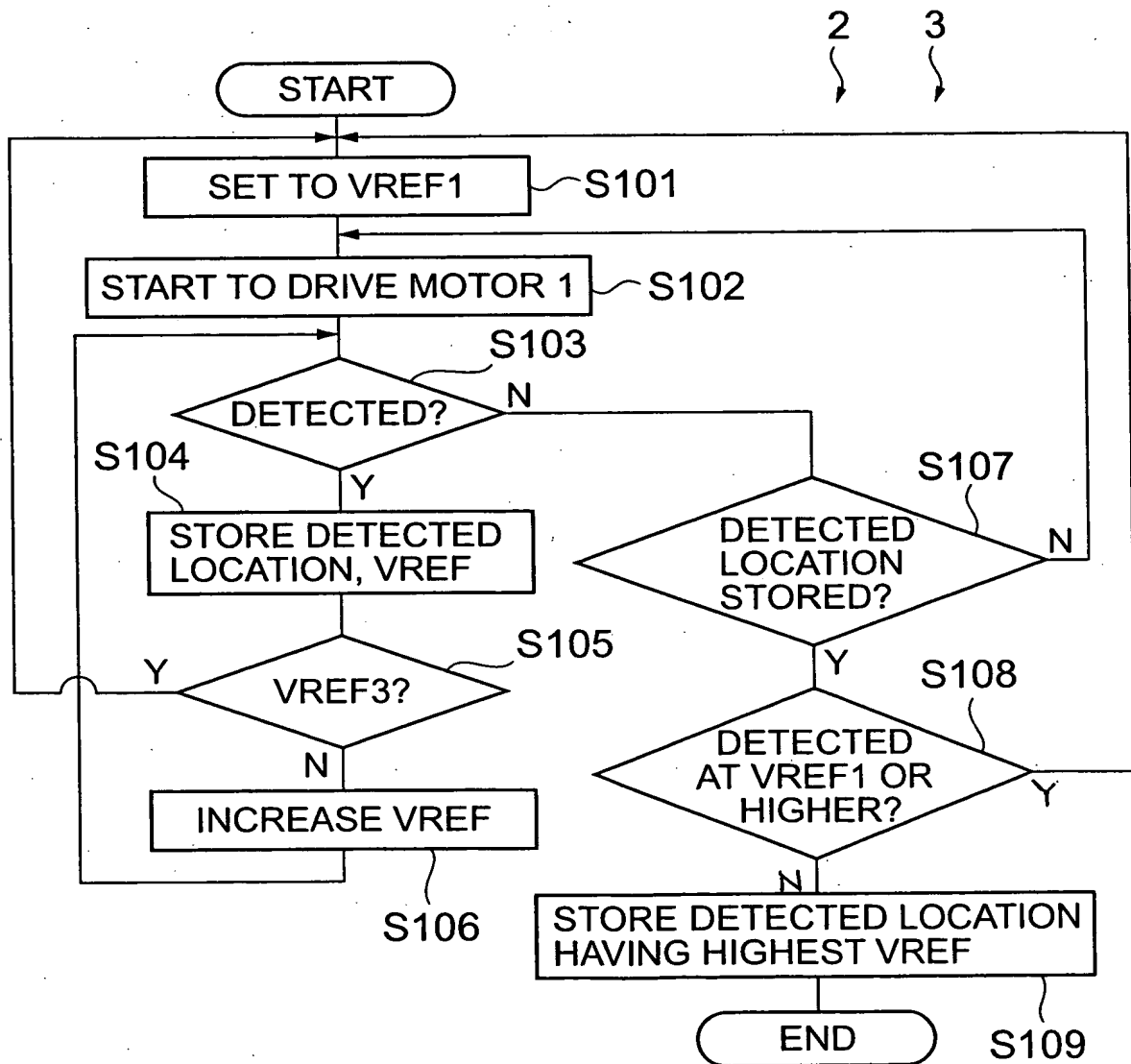


FIG. 12

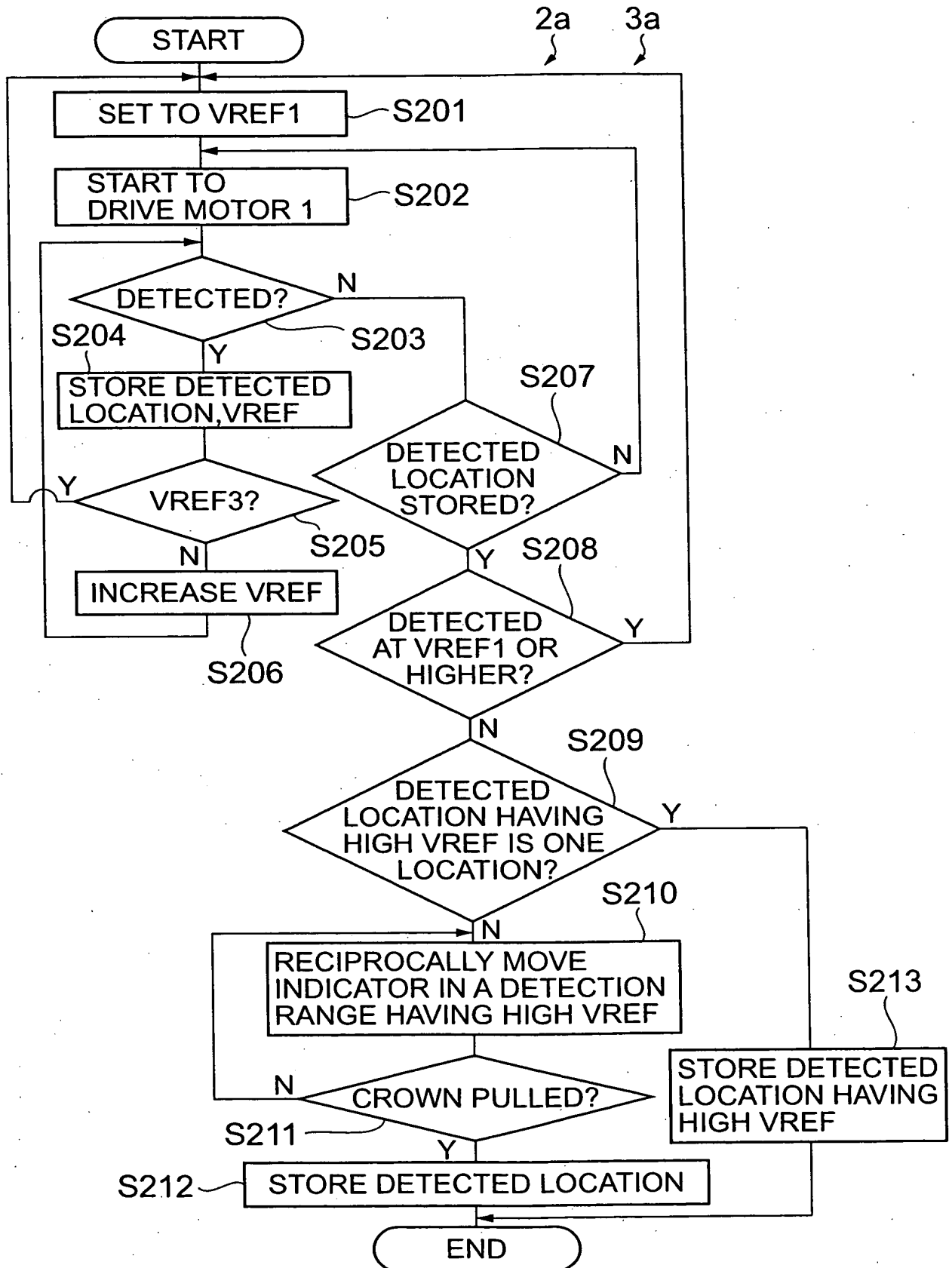


FIG. 13

The diagram illustrates a position detecting device (FIG. 13) with the following components and connections:

- 5**: Initial position determining portion, which includes:
 - 33a**: Received light determining portion, connected to **36** (Rotational position / detectable time period storing portion).
 - 32**: Threshold level adjusting portion, connected to **36**.
 - 37**: Rotational position / detectable time period storing portion, connected to **36**.
 - 38**: Rotational position / detectable time period storing portion, connected to **37**.
 - 39**: Shortest detectable time period / rotational position number determining portion, connected to **37**.
 - 40**: Indicator wheel drive control portion, connected to **39**.
 - 41**: Reciprocal movement control portion, connected to **40**.
 - 42**: Initial position data registering portion, connected to **39**.
- 15**: Motor drive portion, connected to **41**.
- 16**: Motor, connected to **15**.
- 17**: Train wheel including indicator wheel, connected to **16**.
- 18**: Light receiving element, connected to **17**.
- 19**: Position designating and inputting portion, connected to **18**.
- 20**: Designated initial position data detecting portion, connected to **19**.
- 21**: Indicator wheel relative position data storing portion, connected to **20**.
- 22**: Initial position data registering portion, connected to **21**.
- 23**: Shortest detectable time period / rotational position number determining portion, connected to **22**.
- 24**: Reciprocal movement control portion, connected to **23**.
- 25**: Motor drive portion, connected to **24**.
- 26**: Motor, connected to **25**.
- 27**: Train wheel including indicator wheel, connected to **26**.
- 28**: Light receiving element, connected to **27**.
- 29**: Position designating and inputting portion, connected to **28**.
- 30**: Designated initial position data detecting portion, connected to **29**.
- 31**: Indicator wheel relative position data storing portion, connected to **30**.
- 32**: Initial position data registering portion, connected to **31**.
- 33**: Shortest detectable time period / rotational position number determining portion, connected to **32**.
- 34**: Reciprocal movement control portion, connected to **33**.
- 35**: Motor drive portion, connected to **34**.
- 36**: Motor, connected to **35**.
- 37**: Train wheel including indicator wheel, connected to **36**.
- 38**: Light receiving element, connected to **37**.
- 39**: Position designating and inputting portion, connected to **38**.
- 40**: Designated initial position data detecting portion, connected to **39**.
- 41**: Indicator wheel relative position data storing portion, connected to **40**.
- 42**: Initial position data registering portion, connected to **41**.
- 43**: Shortest detectable time period / rotational position number determining portion, connected to **42**.
- 44**: Reciprocal movement control portion, connected to **43**.
- 45**: Motor drive portion, connected to **44**.
- 46**: Motor, connected to **45**.
- 47**: Train wheel including indicator wheel, connected to **46**.
- 48**: Light receiving element, connected to **47**.
- 49**: Position designating and inputting portion, connected to **48**.
- 50**: Designated initial position data detecting portion, connected to **49**.
- 51**: Indicator wheel relative position data storing portion, connected to **50**.
- 52**: Initial position data registering portion, connected to **51**.
- 53**: Shortest detectable time period / rotational position number determining portion, connected to **52**.
- 54**: Reciprocal movement control portion, connected to **53**.
- 55**: Motor drive portion, connected to **54**.
- 56**: Motor, connected to **55**.
- 57**: Train wheel including indicator wheel, connected to **56**.

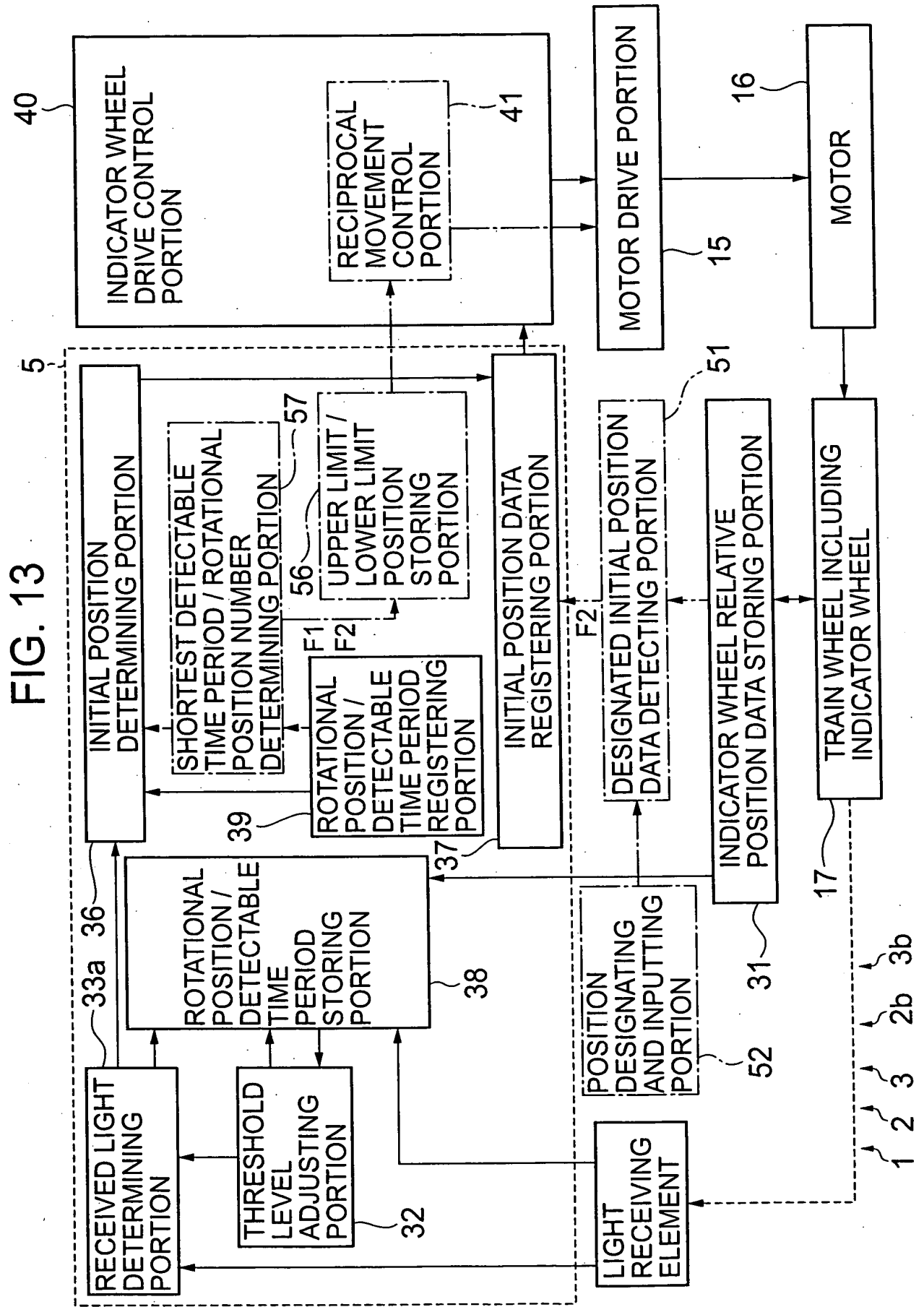


Fig. 14

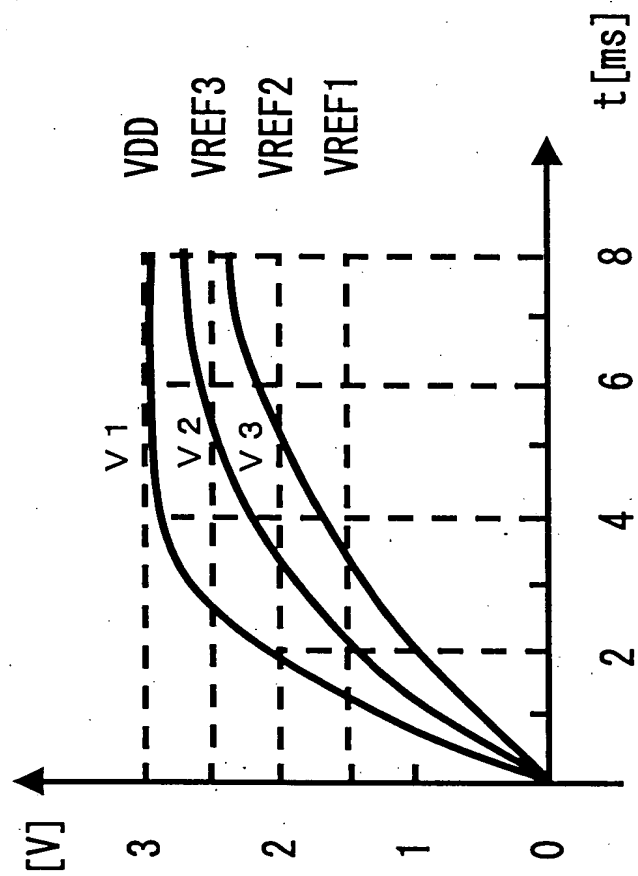
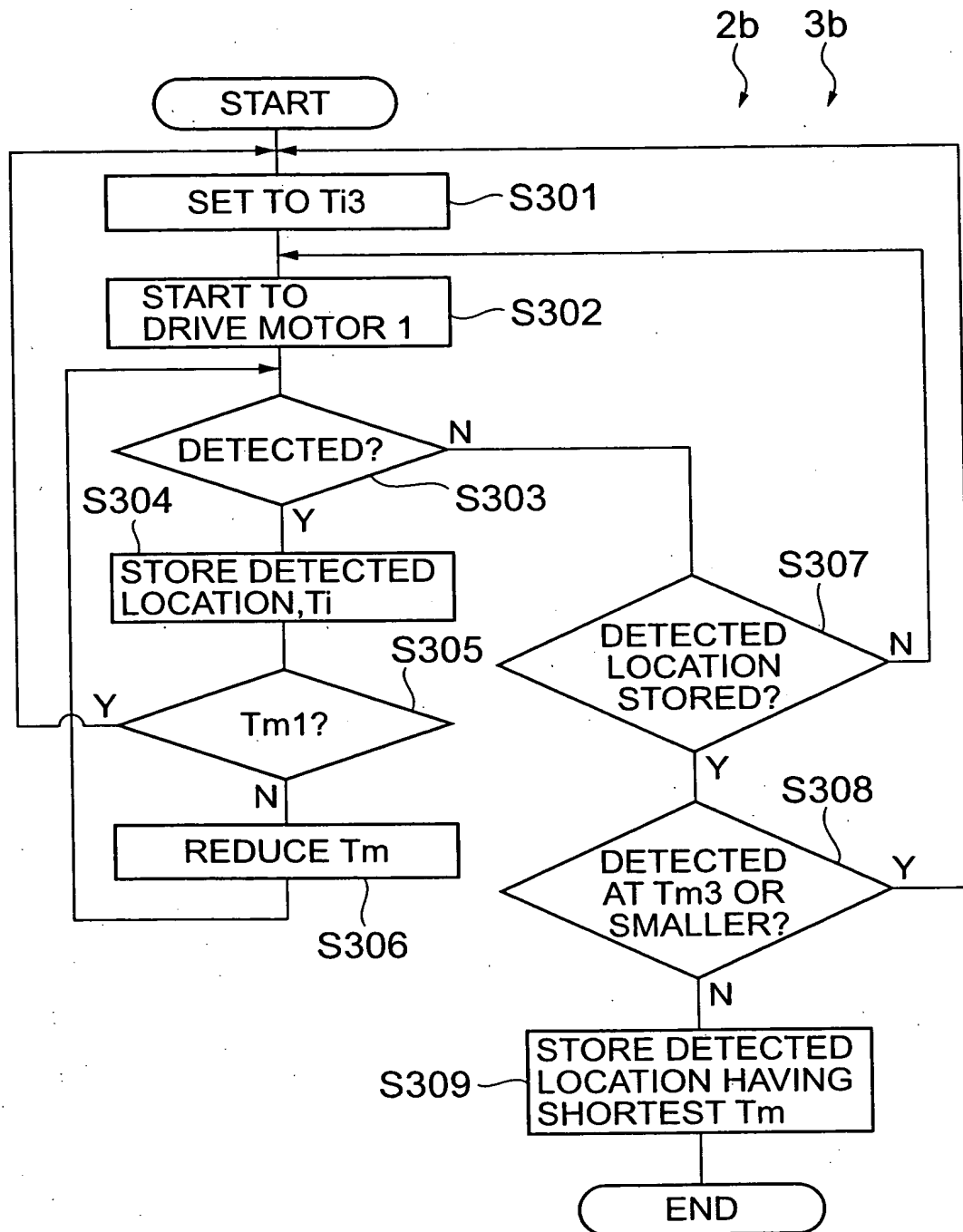


FIG. 15



$Tm1 < Tm2 < Tm3$
IN DETECTING BY LIGHT RECEIVING ELEMENT

FIG. 16

